

CLAIMS

We claim:

1. A stay vane for use with a turbine configuration having components, comprising:
5 a first structure, incorporating a leading edge and a trailing edge with
 respect to a fluid inlet to said turbine configuration,
 wherein said first structure supports said turbine configuration at least in part; and
 a second structure affixed to said trailing edge of said first structure,
 wherein said second structure improves hydraulic performance of said turbine
10 configuration by complementing at least one said component of said turbine
 configuration.
2. The stay vane of claim 1 further comprising at least one connector for affixing
15 said second structure to said trailing edge of said first structure.
3. The stay vane of claim 2 in which said at least one connector is a bolt threadably
 connected to a tapped borehole provided in said first structure as at least one of
 said components of said turbine configuration.
- 20 4. The stay vane of claim 3 in which said borehole is countersunk and the portion
 above said bolt as installed is filled with a sealant selected from the group
 consisting of: an auto body filler, an RTV sealant, an epoxy, and any combination
 thereof.
- 25 5. The stay vane of claim 2 in which said at least one connector is a bolt threadably
 connected to a threaded insert provided in a borehole in said first structure as at
 least one of said components of said turbine configuration.
- 30 6. The stay vane of claim 5 in which said borehole is countersunk and the portion
 above said bolt as installed is filled with a sealant selected from the group

consisting of: an auto body filler, an RTV sealant, an epoxy, and any combination thereof.

- 5 7. The stay vane of claim 1 in which said second structure is affixed to said trailing edge of said first structure by any of a means selected from the group consisting essentially of: welding, soldering, mechanically bonding, chemically bonding, and combinations thereof.
- 10 8. The stay vane of claim 1 in which said at least one complemented component is at least one wicket gate, incorporating a leading edge and a trailing edge with respect to a fluid inlet to said turbine configuration.
- 15 9. The stay vane of claim 8 in which said second structure is permitted to touch said at least one wicket gate in at least one position of said at least one wicket gate relative to said second structure, preferably in the region of said leading edge of said wicket gate, thereby eliminating the gap between said second structure and said wicket gate.
- 20 10. The stay vane of claim 9 in which said second structure is also affixed to said leading edge of said at least one wicket gate.
- 25 11. The stay vane of claim 9 in which said second structure is fabricated from a material selected from the group consisting of: a durable elastic material, a durable flexible material, a durable pliable material, a durable material formed in a telescoping arrangement, a durable material formed in an accordion arrangement, and any combination thereof.
- 30 12. The stay vane of claim 10 in which said second structure is fabricated from a material selected from the group consisting of: a durable elastic material, a durable flexible material, a durable pliable material, a durable material formed in

a telescoping arrangement, a durable material formed in an accordion arrangement, and any combination thereof.

5 13. A hydraulic turbine configuration having components, including at least one wicket gate, at least one stay vane and at least one turbine runner, said stay vane comprising:

10 a first structure, incorporating a leading edge and a trailing edge with respect to a water inlet to said hydraulic turbine configuration, wherein said first structure supports said turbine configuration at least in part; and a second structure affixed to said trailing edge of said first structure, wherein said second structure improves hydraulic performance of said turbine configuration by complementing at least one said component of said turbine configuration.

15 14. The hydraulic turbine configuration of claim 13 further comprising at least one connector for affixing said second structure to said trailing edge of said first structure.

20 15. The hydraulic turbine configuration of claim 14 in which said at least one connector is a bolt threadably connected to a tapped borehole provided in said first structure as at least one of said components of said turbine configuration.

25 16. The hydraulic turbine configuration of claim 15 in which said borehole is countersunk and the portion above said bolt as installed is filled with a sealant selected from the group consisting of: an auto body filler, an RTV sealant, an epoxy, and any combination thereof.

17. The hydraulic turbine configuration of claim 15 in which said at least one connector is a bolt threadably connected to a threaded insert provided in a

borehole in said first structure as at least one of said components of said turbine configuration.

5 18. The hydraulic turbine configuration of claim 17 in which said borehole is countersunk and the portion above said bolt as installed is filled with a sealant selected from the group consisting of: an auto body filler, an RTV sealant, an epoxy, and any combination thereof.

10 19. The hydraulic turbine configuration of claim 13 in which said second structure is affixed to said first structure by any method selected from the group consisting of: welding, soldering, mechanically bonding, chemically bonding, and combinations thereof.

15 20. The hydraulic turbine configuration of claim 13 in which said at least one complemented component is at least one said wicket gate, incorporating a leading edge and a trailing edge with respect to a fluid inlet to said turbine configuration, and at least one said turbine runner,
wherein said at least one wicket gate is complemented by employing said second structure to reduce the width of any gap between said trailing edge of said stay vane as installed and said wicket gate as installed, to include eliminating said gap.
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25 21. The hydraulic turbine configuration of claim 20 in which said second structure touches said at least one wicket gate in at least one position of said wicket gate relative to said stay vane, preferably in the region of said leading edge of said wicket gate, thereby eliminating said gap between said second structure and said wicket gate at said at least one position.

30 22. The hydraulic turbine configuration of claim 21 in which said second structure is also affixed to said leading edge of said at least one wicket gate.

23. The hydraulic turbine configuration of claim 21 in which said second structure is fabricated from a material selected from the group consisting of: a durable elastic material, a durable flexible material, a durable pliable material, a durable material formed in a telescoping arrangement, a durable material formed in an accordion arrangement, and any combination thereof.

24. The hydraulic turbine configuration of claim 22 in which said second structure is fabricated from a material selected from the group consisting of: a durable elastic material, a durable flexible material, a durable pliable material, a durable material formed in a telescoping arrangement, a durable material formed in an accordion arrangement, and any combination thereof.

25. An extension incorporated in a turbine configuration having components to include a first structure supporting said turbine configuration at least in part, said first structure incorporating a leading edge and a trailing edge with respect to a fluid inlet to said turbine configuration, said extension comprising:

a second structure affixed to said trailing edge of said first structure, wherein said extension improves hydraulic performance of said turbine configuration by complementing at least one said component of said turbine configuration.

26. The extension of claim 25 further comprising at least one connector for affixing said second structure to said trailing edge of said first structure.

27. The extension of claim 26 in which said at least one connector is a bolt threadably connected to a tapped borehole provided in said first structure as at least one of said components of said turbine configuration.

28. The extension of claim 27 in which said borehole is countersunk and the portion above said bolt as installed is filled with a sealant selected from the group

consisting of: an auto body filler, an RTV sealant, an epoxy, and any combination thereof.

5 29. The extension of claim 25 in which said second structure is affixed to said first structure by any method selected from the group consisting of: welding, soldering, mechanically bonding, chemically bonding, and combinations thereof.

10 30. The extension of claim 25 in which said at least one connector is a bolt threadably connected to a threaded insert provided in a borehole in said first structure as at least one of said components of said turbine configuration.

15 31. The extension of claim 30 in which said borehole is countersunk and the portion above said bolt as installed is filled with a sealant selected from the group consisting of: an auto body filler, an RTV sealant, an epoxy, and any combination thereof.

20 32. The extension of claim 25 in which said at least one complemented component is at least one wicket gate incorporating a leading edge and a trailing edge with respect to a fluid inlet to said turbine configuration.

25 33. The extension of claim 25 in which said second structure touches said at least one wicket gate in the region of said leading edge of said wicket gate in at least one position of said wicket gate relative to said stay vane, thereby eliminating said gap between said second structure and said wicket gate.

30 34. The extension of claim 33 in which said second structure is also affixed to said leading edge of said at least one wicket gate.

35. The extension of claim 33 in which said second structure is fabricated from a material selected from the group consisting of: a durable elastic material, a

durable flexible material, a durable pliable material, a durable material formed in a telescoping arrangement, a durable material formed in an accordion arrangement, and any combination thereof.

5 36. The extension of claim 34 in which said second structure is fabricated from a material selected from the group consisting of: a durable elastic material, a durable flexible material, a durable pliable material, a durable material formed in a telescoping arrangement, a durable material formed in an accordion arrangement, and any combination thereof.

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37. A method of improving operation of a turbine configuration at least incorporating stay vanes having a leading edge and a trailing edge with respect to a fluid inlet to said turbine configuration, wicket gates, and turbine runners, said method also having potential for reducing casualties among fauna passing through said turbine configuration, comprising:

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designing an extension for said stay vanes that hydraulically complements at least said wicket gates; and

affixing said extension to said stay vanes,

wherein said extension reduces the width of any gap between a trailing edge of each said stay vane and a corresponding said wicket gate of said stay vane.

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38. The method of claim 37 providing for said extension to touch said wicket gate corresponding to said stay vane in at least one position of said wicket gate, preferably when said wicket gate is fully open.

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39. The method of claim 37 further comprising affixing said extension to said wicket gate corresponding to said stay vane.

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40. The method of claim 37 further designing said extension to complement said turbine runners.

41. The method of claim 37 providing for said extension to reduce the width of said gap between said stay vanes and said wicket gates by an amount from about 25–100% of said gap before installation of said extension.

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42. A wicket gate for use with a turbine configuration, said turbine configuration having components, including at least one complemented component, comprising:
a first structure, incorporating a leading edge and a trailing edge with respect to a fluid inlet to said turbine configuration,

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wherein said first structure pivots about an axis to control water flow through said turbine; and

a second structure affixed to said leading edge of said first structure, wherein said second structure improves hydraulic performance of said turbine configuration by complementing at least one said component of said turbine configuration.

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43. The wicket gate of claim 42 in which said second structure is affixed to said leading edge of said first structure in a manner selected from the group consisting essentially of: welding, soldering, mechanically bonding, chemically bonding, and combinations thereof.

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44. The wicket gate of claim 42 in which said at least one complemented component is at least one stay vane, incorporating a leading edge and a trailing edge with respect to a fluid inlet to said turbine configuration.

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45. The wicket gate of claim 44 in which said second structure is permitted to touch said at least one stay vane in at least one position of said at least one wicket gate relative to said stay vane, preferably in the region of said trailing edge of said stay vane, thereby eliminating the gap between said second structure and said stay vane.

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46. The wicket gate of claim 45 in which said second structure is also affixed to said trailing edge of said at least one stay vane.

5 47. The wicket gate of claim 45 in which said second structure is fabricated from a material selected from the group consisting of: a durable elastic material, a durable flexible material, a durable pliable material, a durable material formed in a telescoping arrangement, a durable material formed in an accordion arrangement, and any combination thereof.

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48. The wicket gate of claim 46 in which said second structure is fabricated from a material selected from the group consisting of: a durable elastic material, a durable flexible material, a durable pliable material, a durable material formed in a telescoping arrangement, a durable material formed in an accordion arrangement, and any combination thereof.

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49. An extension incorporated in a turbine configuration having components to include a first structure supporting said turbine configuration at least in part, said first structure incorporating a leading edge and a trailing edge with respect to a fluid inlet to said turbine configuration, said extension comprising:

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a second structure affixed to said leading edge of said first structure, wherein said extension improves hydraulic performance of said turbine configuration by complementing at least one said components of said turbine configuration.

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50. The extension of claim 49 in which said second structure is affixed to said first structure by any method selected from the group consisting of: welding, soldering, mechanically bonding, chemically bonding, and combinations thereof.

51. The extension of claim 49 in which said at least one complemented component is at least one stay vane incorporating a leading edge and a trailing edge with respect to a fluid inlet to said turbine configuration.

5 52. The extension of claim 49 in which said second structure touches said at least one stay vane in at least one position of said wicket gate relative to said stay vane in the region of said trailing edge of said stay vane, thereby eliminating said gap between said second structure and said stay vane.

10 53. The extension of claim 49 in which said second structure is fabricated from a material selected from the group consisting of: a durable elastic material, a durable flexible material, a durable pliable material, a durable material formed in a telescoping arrangement, a durable material formed in an accordion arrangement, and any combination thereof.

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